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WE CLAIM:

1. A tiltable chair comprising:

a base member;

a seat;

a back; and

a linkage assembly connecting the seat and back to the base member, said linkage assembly adapted to allow the seat and back to tilt downwardly and rearwardly and to allow pivotal movement of the seat about a pivot axis substantially in alignment with the hip joints of a user to reduce shear forces.

2. The chair of claim 1 wherein the back is rigidly connected to a pair of first links adapted to be pivotally mounted to the base member, each first link having an end pivotally attached to a lateral portion of the seat at said hip pivot axis of the user, whereby rearward tilting by a user causes the seat to pivot about the hip pivot axis and also causes tilting movement of the first links relative to the base member such that the seat and back tilt downwardly and rearwardly.

3. The chair of claim 2 wherein the back is rigidly connected to the first links by a pair of second links, said second links having an end pivotally mounted to the base member to provide the tilting movement of the first links, seat and back.

4. The chair of claim 3 wherein the ends of the second links are pivotally mounted to a forward portion of the base member and a forward section of the second links extends upwardly and rearwardly from said ends to create an effective pivot point at substantially the ankles of a user having feet resting on a floor, whereby the seat tilts downwardly and rearwardly about said ankle pivot point such that a forward edge portion thereof moves rearwardly without rising a substantial amount.

5. The chair of claim 2 further comprising a restraining link having

one end pivotally attached to a rear portion of the seat and another end pivotally attached to the base member to limit tilting of the seat.

5 6. The chair of claim 1 wherein the linkage assembly is configured such that the angle between the back and a horizontal plane increases at a greater rate than the angle between the seat and a horizontal plane as a user tilts rearwardly.

10 7. The chair of claim 6 wherein the back includes a bowed section to support the lumbar region of a back of a user and the greater rearward tilting of the back relative to the seat automatically lowers the bowed section to accommodate the changing position of the lumbar region of the user.

8. The chair of claim 1 wherein the seat comprises a membrane of elastic material pre-stretched across a central opening in a frame member to provide a support which conforms to the body of a user when the chair is in any tilt position.

15 9. The chair of claim 1 wherein the back comprises a membrane of elastic material pre-stretched across a central opening in a frame member to provide a support which conforms to the body of a user when the chair is in any tilt position.

20 10. The chair of claim 9 further comprising a brace member positioned horizontally across the back at approximately the lumbar region of a back of a user, said brace member being adjustable to provide a desired pressure against the membrane to support the back of the user.

11. The chair of claim 10 wherein the brace member is height adjustable.

25 12. The chair of claim 1 further comprising a pair of armrests adapted to tilt with the back such that the relative angle therebetween remains constant

during tilting, the armrests also adapted to pivot laterally in a plane substantially perpendicular to the back to accommodate the angle at which the forearms of a user are positioned.

5 13. The chair of claim 12 wherein each armrest is pivotal about an axis adjacent a corresponding side edge portion of the back, said axes being positioned for approximate alignment with the elbows of a user having forearms resting on the armrests.

 14. The chair of claim 13 wherein the armrests are height adjustable.

10 15. A tiltable chair comprising:

 a base member;

 a seat;

 a back; and

 a linkage assembly between the base member, seat and back, said linkage assembly adapted to allow the seat and back to tilt downwardly and rearwardly such that the seat pivots about an effective pivot point at substantially the ankles of a user having feet resting on a floor, said linkage assembly also adapted to allow one of the back and the seat to tilt relative to the other about a pivot axis in substantial alignment with the hip joints of a user such that the angle between the back and seat increases as the seat and back pivot rearwardly about the ankle of a user.

15 16. The chair of claim 15 wherein the linkage assembly is configured such that the angle between the back and a horizontal plane increases at a greater rate than the angle between the seat and a horizontal plane as the chair is tilted by a user.

20 17. The chair of claim 16 wherein the seat and chair are tiltable between a forward position in which the seat is tilted forwardly at an angle from a horizontal plane and the angle between the seat and back is greater than 95°, a middle position in which the seat is substantially horizontal and the angle between

the back and seat is approximately 104° , and a reclined position in which the seat is tilted rearwardly at an angle approximately 11° from a horizontal plane and the angle between the back and seat is approximately 108° .

5 18. The chair of claim 16 further comprising a restraining link having one end pivotally attached to a rear portion of the seat and another end pivotally attached to the base member to limit the rate at which the seat tilts.

19. The chair of claim 16 wherein the linkage assembly is adapted to allow pivotal movement of both the back and seat about the hip pivot axis as the seat and back tilt downwardly and rearwardly.

10 20. The chair of claim 15 wherein the linkage assembly includes a pair of first links fixedly attached to a pair of second links and having an end pivotally attached to a lateral portion of the seat at said hip pivot axis of the user, each second link having a forward portion extending upwardly and rearwardly from an end which is pivotally mounted to a forward portion of a base member to create
15 the effective pivot point of the seat at substantially the ankles of a user.

21. The chair of claim 15 wherein the back includes a bowed section to support the lumbar region of a back of a user and the greater rearward tilting of the back relative to the seat automatically lowers the bowed section to accommodate the changing position of the lumbar region of the user.

20 22. The chair of claim 15 wherein the seat comprises a membrane of elastic material pre-stretched across a central opening in a frame member to provide a support which conforms to the body of a user when the chair is in any tilt position.

25 23. The chair of claim 22 wherein the back comprises a membrane of elastic material pre-stretched across a central opening in a frame member to provide a support which conforms to the body of a user when the chair is in any

tilt position.

24. The chair of claim 23 further comprising a brace member positioned horizontally across the back at approximately the lumbar region of a back of a user, said brace member being adjustable to provide a desired pressure against the membrane to support the back of the user.

25. The chair of claim 24 wherein the brace member is height adjustable.

26. The chair of claim 15 further comprising a pair of armrests adapted to tilt with the back such that the relative angle therebetween remains constant during tilting, the armrests also adapted to pivot laterally in a plane substantially perpendicular to the back to accommodate the angle at which the forearms of a user are positioned.

27. The chair of claim 26 wherein each armrest is pivotal about an axis adjacent a corresponding side edge portion of the back, said axes being positioned for approximate alignment with the elbows of a user having forearms resting on the armrests.

28. The chair of claim 27 wherein the armrests are height adjustable.

29. A tiltable chair comprising:
a base member;
a seat having front, rear and lateral edge portions;
a back;
a pair of first links having an end pivotally attached to the lateral portions of the seat in alignment with a pivot axis at substantially the hip joint of a user;

a pair of second links having a first section fixedly connected to the first links and the back and a second section angled downwardly from the first

section, said second section terminating in an end pivotally mounted to a forward portion of the base member; and

5 a pair of restraining links having one end pivotally attached to a rear portion of the seat and another end pivotally attached to the base member to limit tilting of the seat;

whereby the first links, second links, and restraining links create an effective pivot point of the seat at substantially the ankles of a user having feet resting on a floor and the seat pivots about the hip axis of a user to increase the angle therebetween as the back and seat tilt rearwardly.

10 30. The chair of claim 29 wherein the seat and chair are tiltable between a forward position in which the seat is tilted forwardly at an angle from a horizontal plane and the angle between the seat and back is greater than 95° , a middle position in which the seat is substantially horizontal and the angle between the back and seat is approximately 104° , and a reclined position in which the seat
15 is tilted rearwardly at an angle approximately 11° from a horizontal plane and the angle between the back and seat is approximately 108° .

20 31. The chair of claim 29 wherein the back includes a bowed section to support the lumbar region of a back of a user and the greater rearward tilting of the back relative to the seat automatically lowers the bowed section to accommodate the changing position of the lumbar region of the user.

32. The chair of claim 29 wherein the seat comprises a membrane of elastic material pre-stretched across a central opening in a frame member to provide a support which conforms to the body of a user when the chair is in any tilt position.

25 33. The chair of claim 29 wherein the back comprises a membrane of elastic material pre-stretched across a central opening in a frame member to provide a support which conforms to the body of a user when the chair is in any tilt position.

34. The chair of claim 33 further comprising a height adjustable brace member positioned horizontally across the back at approximately the lumbar region of a back of a user, said brace member being adjustable to provide a desired pressure against the membrane to support the back of the user.

5 35. The chair of claim 29 further comprising a pair of height adjustable armrests adapted to pivot laterally in a plane substantially perpendicular to the back to accommodate the angle at which the forearms of a user are positioned.

36. A tiltable chair comprising:

10 a seat having a membrane of elastic material pre-stretched across a central opening in a frame member to provide a support which conforms to the body of a user when the chair is in any tilt position;

15 a back having a membrane of elastic material pre-stretched across a central opening in a frame member to provide a support which conforms to the body of a user when the chair is in any tilt position, said frame member having a bowed section to support the lumbar region of a back of a user

20 a height adjustable brace member positioned horizontally across the back at approximately the lumbar region of a back of a user, said brace member being adjustable to provide a desired pressure against the membrane to support the back of the user;

25 a pair of height adjustable armrests adapted to tilt with the back such that the angle therebetween remains constant during tilting, said armrests also adapted to laterally pivot in a plane substantially perpendicular to the back about axes adjacent side edge portions of the back, said axes being positioned for approximate alignment with the elbows of a user having forearms resting on the armrests; and

30 a linkage assembly adapted to allow the seat and back to tilt downwardly and rearwardly such that the seat pivots about an effective pivot point at substantially the ankle of a user having feet resting on a floor, said linkage assembly also adapted to allow pivotal movement of the seat about a pivot axis at substantially the hip joints of a user such that the angle between the back and a horizontal plane increases at a greater rate than the angle between the seat and a

horizontal plane as a user pivots the back and seat, said pivotal movement of the back relative to the seat automatically moving the bowed section of the frame in a generally vertical direction to accommodate the changing position of the lumbar region of the user.

5 37. A vertically adjustable column for supporting the seat of a chair, the column comprising:

an outer guide tube mounted to a support stand;

an intermediate telescoping tube slidably positioned within the outer guide tube;

10 an inner telescoping tube slidably positioned within the intermediate tube and having an upper portion thereof connected to a seat support member; and

a gas spring including a cylinder mounted within the inner tube, a piston rod extending outwardly from the cylinder in an axial direction and having an end connected to a bottom portion of the outer guide member, and a control pin assembly mounted to an upper portion of the cylinder for operable engagement with an actuator member, said piston rod being extensible between a collapsed position in which the cylinder and inner tube are substantially within the intermediate tube and the intermediate tube is substantially within the outer guide tube, and a raised position in which a portion of the cylinder and inner tube extend outwardly from the intermediate tube and a portion of the intermediate tube extends outwardly from the outer guide tube.

15 38. The column of claim 37 wherein approximately one half the length of the inner tube is within the intermediate tube and approximately one half the length of the intermediate tube is within the outer guide tube when the piston rod is extended to the raised position.

20 39. The column of claim 37 further comprising a spring positioned within a bottom portion of the outer guide tube, said spring engaging the intermediate tube to bias said intermediate tube in an upward direction.

25 40. The column of claim 37 further comprising first retaining means for

limiting the upward travel of the intermediate tube within the outer guide tube and second retaining means for limiting the upward travel of the inner tube within the intermediate tube.

5 41. The column of claim 40 wherein the first retaining means comprises an outer collar mounted to a top edge portion of the outer guide tube for engagement with an exterior shoulder of the intermediate tube, and the second retaining means comprises an inner collar mounted to a bottom edge portion of the inner tube for engagement with an interior shoulder of the intermediate tube.

10 42. The column of claim 41 wherein the exterior shoulder and interior shoulder of the intermediate tube are at substantially the middle of the length of said intermediate tube.

15 43. The column of claim 39 wherein the distance between a floor and a bottom of the outer guide tube is approximately one half inch and the height of the outer guide tube is approximately 8½ inches to allow the seat support member to be lowered to a height of approximately 9 inches from the floor, and the stroke of the piston rod is approximately 7 inches to allow the seat support member to be raised to a height of approximately 16 inches from the floor.

20 44. The column of claim 37 further comprising a frusto-conically shaped mounting member attached to the outer guide tube and mating with a frusto-conically shaped cavity formed in the support stand.

25 45. The column of claim 44 wherein the mounting member is attached to an upper portion of the outer guide tube and fits within an upper portion of said cavity, and a lower portion of the guide tube bears against an inner wall of the cavity at a lower portion thereof to securely mount the column to the support stand.

 46. The column of claim 45 wherein the support stand includes a

plurality of legs extending radially outward from a center portion thereof, said cavity being formed in said center portion and being further defined by a hub extending downwardly from the juncture of the legs, thereby providing lateral support for the bottom of the outer tube to allow said outer tube to be mounted in a low position relative to a floor.

47. A vertically adjustable column for supporting a chair, the column comprising:

an outer guide tube mounted to a support stand and having a collar mounted to a top portion thereof, the inner diameter of said collar being smaller than the inner diameter of the outer guide tube;

an intermediate telescoping tube slidably positioned within the outer guide tube, said intermediate tube having an interior shoulder and an exterior shoulder, the exterior shoulder bearing against the collar of the outer tube to limit the upward travel of the intermediate tube;

an inner telescoping tube slidably positioned within the intermediate tube and having an upper portion thereof connected to a seat support member, said inner tube having a collar mounted to a bottom portion thereof which bears against the interior shoulder of the intermediate tube to limit the upward travel of the inner tube; and

a gas spring including a cylinder mounted within the inner tube, a piston rod extending outwardly from the cylinder in an axial direction and having an end connected to a bottom portion of the outer guide member, and a control pin assembly mounted to an upper portion of the cylinder for operable engagement with an actuator member, said piston rod being extensible between a collapsed position in which the cylinder and inner tube are substantially within the intermediate tube and the intermediate tube is substantially within the outer guide tube, and a raised position in which a portion of the cylinder and inner tube extend outwardly from the intermediate tube and a portion of the intermediate tube extends outwardly from the outer guide tube.

48. The column of claim 47 wherein the exterior shoulder of the

intermediate tube is at substantially the middle of the length of said tube so that approximately half the length thereof is within the outer guide tube when the piston rod is extended to the raised position, and the interior shoulder of the intermediate tube is at substantially the middle of the length of said tube so that approximately half the length of the inner tube is within the outer guide tube when the piston rod is extended to the raised position.

49. The column of claim 48 wherein the distance between a floor and a bottom of the outer guide tube is approximately one half inch and the height of the outer guide tube is approximately 8½ inches to allow the seat support member to be lowered to a height of approximately 9 inches from the floor, and the stroke of the piston rod is approximately 7 inches to allow the seat support member to be raised to a height of approximately 16 inches from the floor.

50. The column of claim 47 further comprising a spring positioned within a bottom portion of the outer guide tube, said spring engaging the intermediate tube to bias said intermediate tube in an upward direction.

51. A vertically adjustable column for supporting a chair, the column comprising:

an outer tube mounted to a support stand and having a bushing attached to a top portion thereof, the inner diameter of said bushing being smaller than the inner diameter of the outer tube;

an intermediate telescoping tube slidably positioned within the outer tube and being radially spaced therefrom, said intermediate tube having a lower bushing mounted to a lower portion thereof and an upper bushing mounted to an upper portion thereof, said outer tube bushing slidably bearing against the intermediate tube and said lower bushing of the intermediate tube slidably bearing against the outer tube;

a first spacer positioned between the outer tube and intermediate tube and the outer tube bushing and intermediate tube lower bushing, whereby the first spacer bears against said bushings to limit upward travel of the intermediate

tube within the outer tube;

an inner telescoping tube positioned within the intermediate tube and being radially spaced therefrom, said inner tube having a bushing mounted to a lower portion thereof and a seat support member connected to an upper portion thereof, said inner tube bushing slidably bearing against the intermediate tube and said upper bushing of the intermediate tube slidably bearing against the inner tube;

a second spacer positioned between the inner tube and intermediate tube and the intermediate tube upper bushing and inner tube bushing, whereby the second spacer bears against the inner tube bushing and intermediate tube upper bushing to limit upward travel of the inner tube within the intermediate tube; and

a gas spring including a cylinder mounted within the inner tube, a piston rod extending outwardly from the cylinder in an axial direction and having an end connected to a bottom portion of the outer guide member, and a control pin assembly mounted to an upper portion of the cylinder for operable engagement with an actuator member, said piston rod being extensible between a collapsed position in which the cylinder and inner tube are substantially within the intermediate tube and the intermediate tube is substantially within the outer guide tube, and a raised position in which a portion of the cylinder and inner tube extend outwardly from the intermediate tube and a portion of the intermediate tube extends outwardly from the outer guide tube.

52. The column of claim 47 wherein the first and second spacers are annular bands.

53. The column of claim 47 further comprising a frusto-conically shaped mounting member attached to an upper portion of the outer tube and mating with an upper portion of a frusto-conically shaped cavity formed in the support stand, a lower portion of the guide tube bearing against an inner wall of the cavity at a lower portion thereof to securely mount the column to the support stand.

54. A chair comprising:

a pair of armrests adapted to be mounted to the chair to allow pivotal movement in a lateral direction to accommodate the angle at which the forearms of a user are positioned on the armrests.

5 ~~55.~~ The chair of claim 54 wherein each armrest is pivotal about an axis adjacent a corresponding side edge portion of the back, said axes being positioned for approximate alignment with the elbows of a user having forearms resting on the armrests.

10 56. The chair of claim 55 wherein the armrests are pivotally mounted to a pair of support arms, each support arm having a detent member in operable engagement with an irregular surface of the armrests, said detent members being biased in a direction toward said irregular surfaces to lock the armrests in a desired position.

15 57. The chair of claim 55 wherein the armrests are adapted to be locked into predetermined pivotal positions.

20 58. The chair of claim 54 wherein the armrests are height adjustable.

25 59. The chair of claim 58 wherein the armrests are height adjustable relative to a back frame of the chair by a pawl and rack mechanism.

30 60. A chair comprising:
 a back frame including side members having a plurality of vertically aligned teeth extending outward therefrom;
 a seat carrier member connected to the back frame and having a pair of vertically extending sleeve members adapted to mate with the side members of the back frame, said sleeve members having a vertical slot therein;
 a pair of support arms slidably attached to the seat carrier sleeve members, said support arms having a pawl pivotally mounted thereto which extends through the slot in the seat carrier and is biased in a direction toward the

back frame for engagement with the teeth, whereby a user pivots the pawl out of engagement with the teeth to move the support arm in a generally vertical direction and releases the pawl to lock the support arm at a desired height; and
5 a pair of armrests pivotally mounted to the support arms, each support arm having a detent member in operable engagement with an irregular surface of the armrests, said detent members being biased in a direction toward said irregular surfaces to lock the armrests in a desired position.

61. A support assembly for supporting the body of a user in a chair, the support assembly comprising:

10 a frame member having an central opening therethrough and a channel formed around the perimeter thereof;
a carrier member adapted to fit inside the channel; and
a membrane of elastic material covering the central opening and adapted to be attached to the carrier member.

15 62. The support assembly of claim 61 wherein said membrane is pre-stretched prior to insertion of the carrier member in the channel to accommodate for the contour of the body of a user.

20 63. The support assembly of claim 62 wherein the support assembly defines a seat and said membrane is pre-stretched in a longitudinal direction between a forward and rear portion of the carrier member in the range of 6% to 9% of an unstretched length of the mat, and said membrane is pre-stretched in a lateral direction between side portions of the carrier member in the range of 1% to 2% of an unstretched width of the mat.

25 64. The support assembly of claim 62 wherein the carrier member is of one-piece construction and deformable.

65. The support assembly of claim 61 wherein the carrier member is press fit into the frame member channel.

66. The support assembly of claim 65 wherein the carrier member is made of a resilient material.

67. The support assembly of claim 66 wherein an edge portion of said membrane is molded with the carrier member.

5 68. The support assembly of claim 61 wherein the carrier member is adapted to be snap-fit into the frame member channel.

69. The support assembly of claim 68 wherein an edge portion of said membrane is welded to the carrier member.

10 70. The support assembly of claim 68 wherein an edge portion of said membrane is attached to an insert adapted to fit in a cavity formed in said carrier member.

71. The support assembly of claim 70 wherein said edge portion of said membrane is molded with the insert.

15 72. The support assembly of claim 70 wherein the edge portion of said membrane is welded to the insert.

73. A support assembly for supporting the body of a user in a chair, the support assembly comprising:

a frame member having an central opening therethrough and a channel formed around the perimeter thereof;

20 a one-piece deformable carrier member adapted to fit inside the channel; and

a membrane of elastic material covering the central opening, said membrane having an edge portion attached to the carrier member and said carrier member being expanded a desired amount prior insertion into the channel to pre-stretch said membrane a desired amount.

25 74. The support assembly of claim 73 wherein the carrier member is

press fit into the frame member channel.

75. The support assembly of claim 74 wherein the edge portion of said membrane is molded with the carrier member.

5 76. The support assembly of claim 73 wherein the carrier member has sufficient rigidity to maintain a shape substantially the same as the channel after expansion thereof to allow said carrier member to be snap-fit into the frame member channel.

10 77. The support assembly of claim 76 wherein the edge portion of said membrane is attached to an insert adapted to fit in a cavity formed in said carrier member.

78. A support assembly for supporting the body of a user in a chair, the support assembly comprising:

15 a frame member having an central opening therethrough and a channel formed around the perimeter thereof, the channel including a groove formed in a top surface of the frame member and a plurality of spaced apart slots extending through the frame member from a bottom wall of the groove;

20 a carrier member having a rim portion substantially the same size and shape as the groove and a plurality of spaced apart tabs extending downwardly from the rim portion, said tabs having a hook portion extending outwardly from a lower end thereof and the slots being of sufficient size to receive the tabs, the rim portion fitting in the groove and the tabs extending through the slots such that the hook portion thereof engages an underside of the frame member to secure the carrier member thereto; and

25 a membrane of elastic material having an edge portion adapted to be attached to the carrier member such that said membrane covers the central opening.

79. The support assembly of claim 78 wherein the support assembly defines a seat and said membrane is pre-stretched in a longitudinal direction

between a forward and rear portion of the carrier member in the range of 6% to 9% of an unstretched length of the mat, and said membrane is pre-stretched in a lateral direction between side portions of the carrier member in the range of 1% to 2% of an unstretched width of the mat.

5 80. The support assembly of claim 78 wherein the edge portion of said membrane is welded to the carrier member.

81. The support assembly of claim 78 wherein the edge portion of said membrane is attached to an insert adapted to fit in a cavity formed in said carrier member.

10 82. An exposed fabric having a weave pattern for supporting the body of a user in a chair, the fabric comprising:

 a plurality of groups of parallel strands of multifilament yarn, each group having at least two adjacent strands; and

15 a plurality of monofilaments arranged in generally perpendicular interlocking relationship with the strands, said monofilaments weaving alternatively above and below adjacent strands in a group, and said groups being held in place by a plurality of pairs of said monofilaments, the monofilaments in each pair crossing over between each group of strands to thereby maintain the position of the groups.

20 83. The fabric of claim 82 wherein each of said groups comprises three strands of yarn.

84. The fabric of claim 82 wherein the monofilaments are made of an elastomeric material.

25 85. The fabric of claim 84 wherein the monofilaments are prestretched across an opening in a frame member.

86. The fabric of claim 84 wherein the monofilaments have a greater

width than thickness to increase the surface area in contact with a user sitting on the fabric.

87. The fabric of claim 86 wherein the monofilaments have an elliptical cross-section.

5 88. The fabric of claim 84 further comprising an elastomeric monofilament attached to each strand of yarn.

89. The fabric of claim 82 wherein there are about 24-26 monofilaments per inch and about 7-10 strands per inch.

10 90. The fabric of claim 82 wherein the monofilaments are oriented in a lateral warp direction of a frame member of the chair and the strands are oriented in a longitudinal filling direction of said frame member.

91. An exposed fabric having a weave pattern for supporting the body of a user in a chair, the fabric comprising:

15 a plurality of groups of parallel strands of multifilament yarn oriented in a longitudinal filling direction of a frame member of the chair, each group having at least two adjacent strands; and

20 a plurality of elastomeric monofilaments prestretched in a lateral warp direction of the frame member and arranged in generally perpendicular interlocking relationship with the strands, said monofilaments weaving alternatively above and below adjacent strands in a group, and said groups being held in place by a plurality of pairs of said monofilaments, the monofilaments in each pair crossing over between each group of strands to thereby maintain the position of the groups.

25 92. The fabric of claim 91 wherein each of said groups comprises three strands of yarn.

93. The fabric of claim 91 wherein the monofilaments have an elliptical cross-section.

94. The fabric of claim 91 further comprising an elastomeric monofilament attached to each strand of yarn.

5 95. The fabric of claim 91 wherein there are about 24-26 monofilaments per inch and about 7-10 strands per inch.

96. An exposed fabric for supporting the body of a user in a chair, the fabric comprising:

10 a plurality of generally parallel monofilaments having a greater width than thickness to increase the surface area in contact with a user sitting on the fabric and provide an attractive appearance of the fabric.

97. The fabric of claim 96 wherein the monofilaments have an elliptical cross-section.

15 98. The fabric of claim 96 wherein the monofilaments are made of an elastomeric material.

99. The fabric of claim 97 wherein the monofilaments are prestretched across an opening in a frame member.

20 100. The fabric of claim 96 further comprising a second plurality of monofilaments arranged in generally perpendicular interlocking relationship with said first plurality of monofilaments, said second monofilaments weaving alternatively above and below adjacent monofilaments of said first plurality of monofilaments.

101. An apparatus for controlling the tilt range of a chair and the resistance to tilting of the chair, comprising:

an elastomeric torsion spring mounted to an axle;

5 a tilt rate adjustment mechanism including an outer sleeve member mounted to the spring, a screw having an axis positioned generally tangentially relative to the sleeve member, a block member threadably attached to the screw, an arm extending radially outward from the sleeve and operably engaging the block member, a first gear attached to one end of the screw, and a second gear meshing with the first gear, whereby said second gear is actuated to rotate the first gear and screw, thus moving the block member in a linear direction along the axis of the screw to move the arm a desired radial amount and adjust the initial return torque of the spring;

10

a forward tilt limiter mechanism including an arm extending outwardly from the axle, said arm being operably engageable with a pivot member which is rotatable between a forward tilt position and a standard tilt position; and

15 a rearward tilt limiter mechanism including an arm extending outwardly from the axle, said arm being operably engageable with a cam member which is rotatable to a desired maximum rearward tilting position.

102. A chair comprising:

a control housing;

a seat;

5 a back support comprising an upwardly extending upright portion and a link portion extending forwardly from a lower portion of said upright portion, wherein said link portion is pivotally connected to said control housing about a first pivot axis, and wherein said seat is connected to said link portion and is pivotable relative thereto; and

10 a linkage coupled to said seat and pivotally connected to said control housing at a second pivot axis positioned rearwardly and downwardly from said first pivot axis.

103. The chair of claim 102 wherein said back support comprises a pair of spaced apart upright portions connected to a pair of spaced apart link portions
15 respectively.

104. The chair of claim 103 further comprising a back assembly connected to said pair of upright portions, said back assembly comprising a flexible membrane.

20 105. The chair of claim 104 wherein said flexible membrane comprises an elastic material.

106. The chair of claim 105 wherein said elastic material includes a plurality of elastomeric monofilaments.

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107. The chair of claim 103 further comprising a pair of armrests connected respectively to said upright portions.

108. The chair of claim 103 wherein said seat comprises a frame having a pair side frame elements, wherein said side frame elements are pivotally connected to said pair of link portions respectively.
30

109. The chair of claim 102 wherein said seat is pivotally connected to said link portion and is pivotable relative to said link portion about a third pivot axis, and wherein said linkage is pivotally coupled to said seat.

5

110. The chair of claim 109 wherein said linkage is pivotally coupled to said seat about a fourth pivot axis.

111. The chair of claim 110 wherein said fourth axis is positioned
10 rearwardly of said third pivot axis.

112. The chair of claim 102 further comprising a torsion spring operably connected to said link portion at said first pivot axis.

113. The chair of claim 112 further comprising an arm extending radially
15 from said torsion spring and having an end portion connected to said tilt control housing.

114. The chair of claim 113 wherein said arm is adjustably moveable
20 relative to said tilt control housing wherein an initial restoring torque of said torsion spring can be adjusted.

115. The chair of claim 102 wherein said link portion extends upwardly and
rearwardly from said first pivot axis.

25

116. The chair of claim 102 wherein said linkage comprises first and second spaced apart link members, wherein said first and second link members are coupled to said seat and are pivotally connected to said control housing at said second pivot axis.

117. A chair comprising:
30 a control housing;
a seat comprising a frame having a pair of side frame elements;

a back support comprising a pair of link portions pivotally connected to said control housing about a first pivot axis, wherein said side frames elements of said seat are connected respectively to said link portions and are pivotable about a second pivot axis positioned rearwardly of said first pivot axis; and

5 a pair of link members coupled to said frame and pivotally coupled to said control housing about a third pivot axis positioned rearwardly and downwardly from said first pivot axis, wherein each of said link members extends upwardly and rearwardly from said third pivot axis.

10 118. The chair of claim 117 wherein said pair of link members are pivotable relative to said frame about a fourth pivot axis.

119. The chair of claim 117 wherein said back support further comprises a pair of upright portions extending upwardly respectively from rear portions of said link portions, wherein said link portions extend forwardly from said upright portions.

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120. The chair of claim 119 further comprising a back assembly connected to said pair of upright portions, said back assembly comprising a flexible membrane.

20 121. The chair of claim 120 wherein said flexible membrane comprises an elastic material.

122. The chair of claim 121 wherein said elastic material includes a plurality of elastomeric monofilaments.

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123. The chair of claim 120 wherein said back assembly comprises a frame having a channel formed therein, and a carrier member attached to a portion of said flexible membrane, wherein said carrier member is disposed in said channel.

30 124. The chair of claim 119 further comprising a pair of armrests connected respectively to said upright portions.

125. The chair of claim 118 wherein said second pivot axis is positioned forwardly of said third pivot axis.

5 126. The chair of claim 118 further comprising a torsion spring operably connected to said each of said link portions at said first pivot axis.

127. The chair of claim 126 further comprising an arm extending radially from said torsion spring and having an end portion connected to said tilt control housing.

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128. The chair of claim 127 wherein said arm is adjustably moveable relative to said tilt control housing wherein an initial restoring torque of said torsion spring can be adjusted.

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